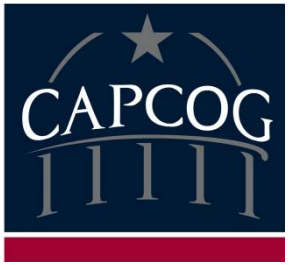
AIR QUALITY IMPACTS OF DECKER CREEK POWER PLANT

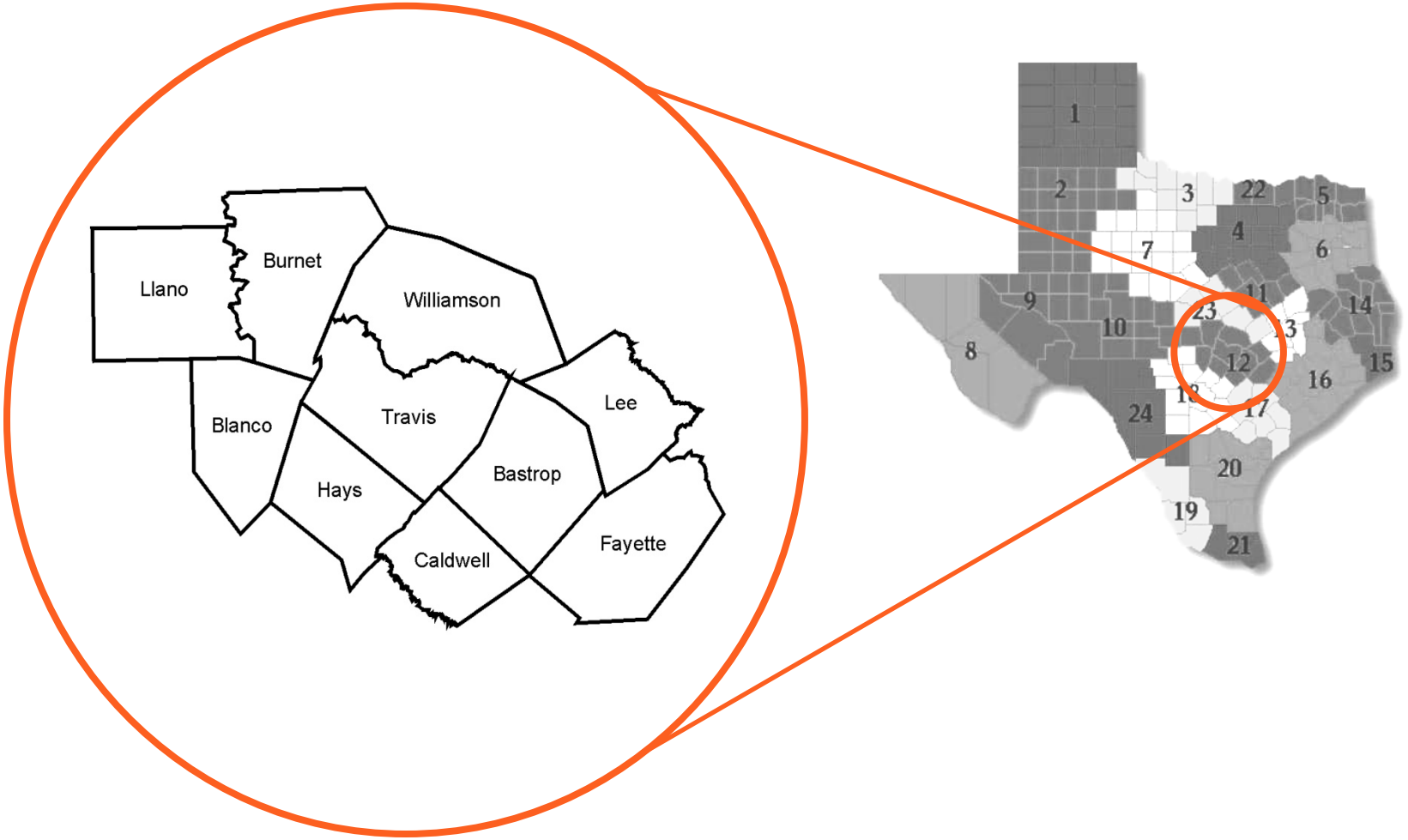
AUSTIN ELECTRIC UTILITY COMMISSION
SEPTEMBER 18, 2017



CAPCOG – Regional Planning Commission in Statute; more often called a COG.

- Emergency Communications 9-1-1
- Area Agency on Aging/Aging & Disability Resource Center
- Homeland Security Planning & Training
- Regional Law Enforcement Academy
- Air Quality Planning
- Solid Waste Planning
- Economic Development Analysis & Technical Assistance
- Transportation Planning

Ten – county service area;
State of Texas planning region 12



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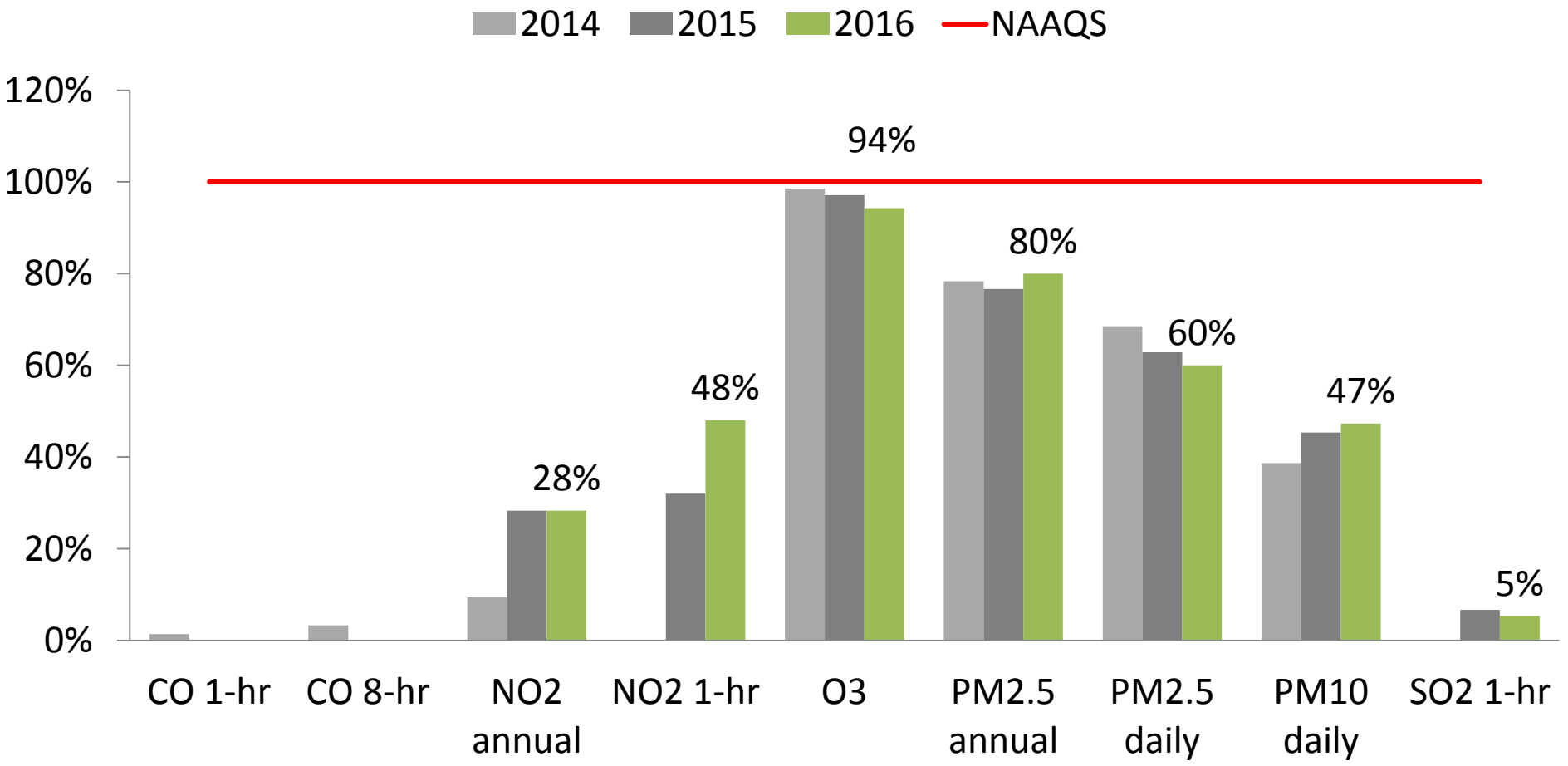
Overview

- Basic Overview of National Ambient Air Quality Standards (NAAQS) and Air Quality Index (AQI)
- Relationship Between Emissions and Air Quality
- Review of Prior Air Quality Modeling Data
- NO_X Emissions at Austin Energy Power Plants
- Review Most Recent Modeling
- Conclusions

National Ambient Air Quality Standards

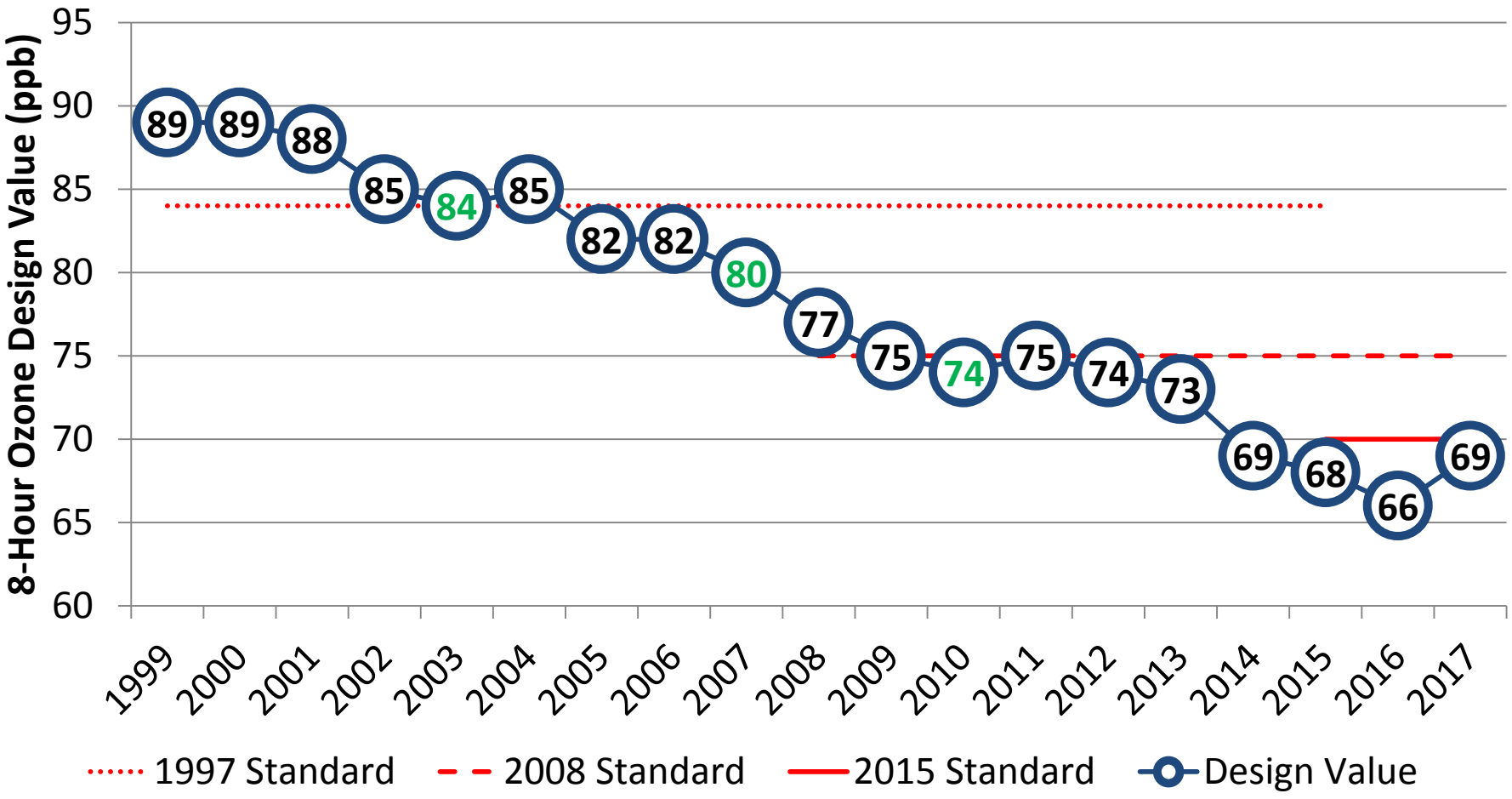
- EPA sets national health-based and welfare-based standards regulating the maximum allowable concentrations of six types of common pollutants:
  - Carbon Monoxide (CO)
  - Nitrogen Dioxide (NO_2)
  - Ground-Level Ozone (O_3)
  - Lead (Pb)
  - Particulate Matter (PM)
  - Sulfur Dioxides (SO_2)

Austin Air Quality Compared to NAAQS



Source: EPA Design Value Reports: https://www.epa.gov/air-trends/air-quality-design-values
PM_{10} values based on 4th-highest PM10 concentration in a 3-year period; available from TCEQ's TAMIS: http://www17.tceq.texas.gov/tamis/index.cfm?fuseaction=home.welcome

Trend in Austin Area Ozone Levels



Source: TCEQ: https://www.tceq.texas.gov/agency/data/ozone_data.html
2017 Data Current as of 9/17/2017

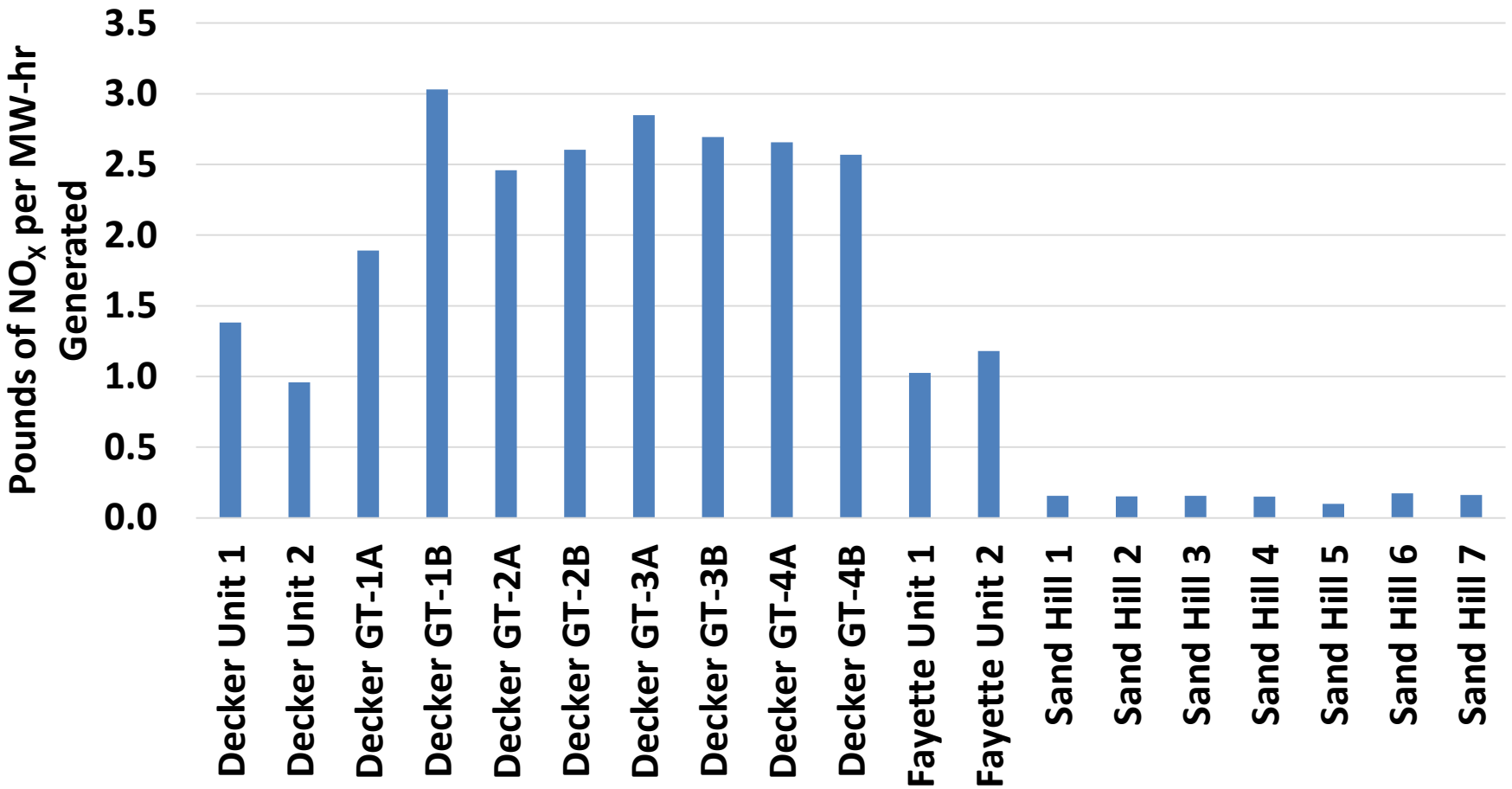
Factors that influence impact of emissions on ambient air pollution concentrations

- Type of emissions (NO_X, VOC)
- Magnitude of emissions (tons per day)
- Timing of emissions (hour of day)
- Location of emissions
- Meteorology (sunlight, humidity, temperature, wind speed, wind direction)

Impacts of NO_X Emissions

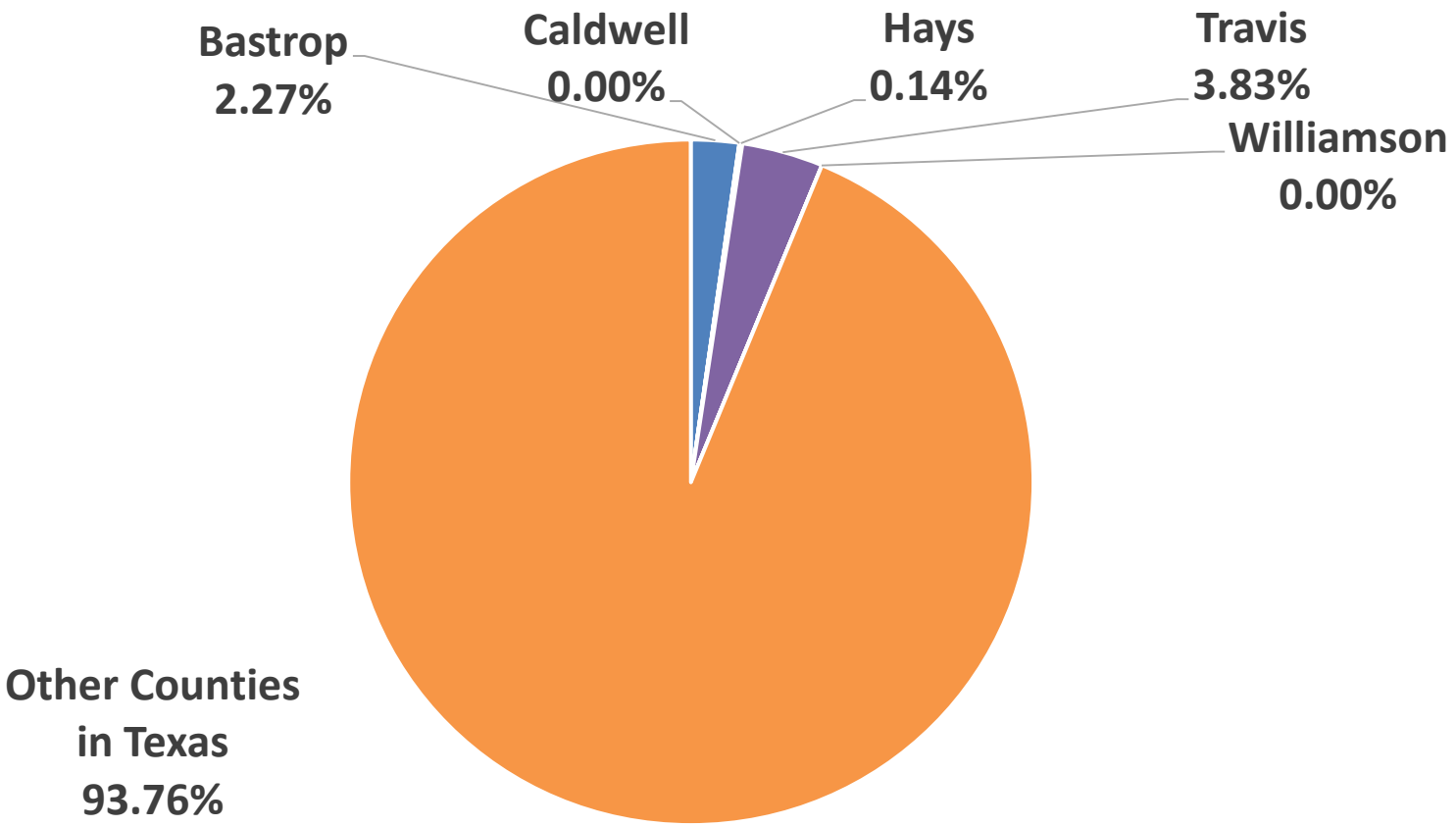
- $NO_X = NO + NO_2$
- Contributes to O_3 formation
  - Health impacts
  - Impacts on vegetation
  - Climate change
- Contributes to $PM_{2.5}$ formation
  - Health impacts
  - Visibility impacts
- Directly increases NO_2 concentrations
  - Health impacts

Comparison of 2016 NO_X Emissions Rates at AE Electric Generating Units (lbs NO_X/MW-hr)



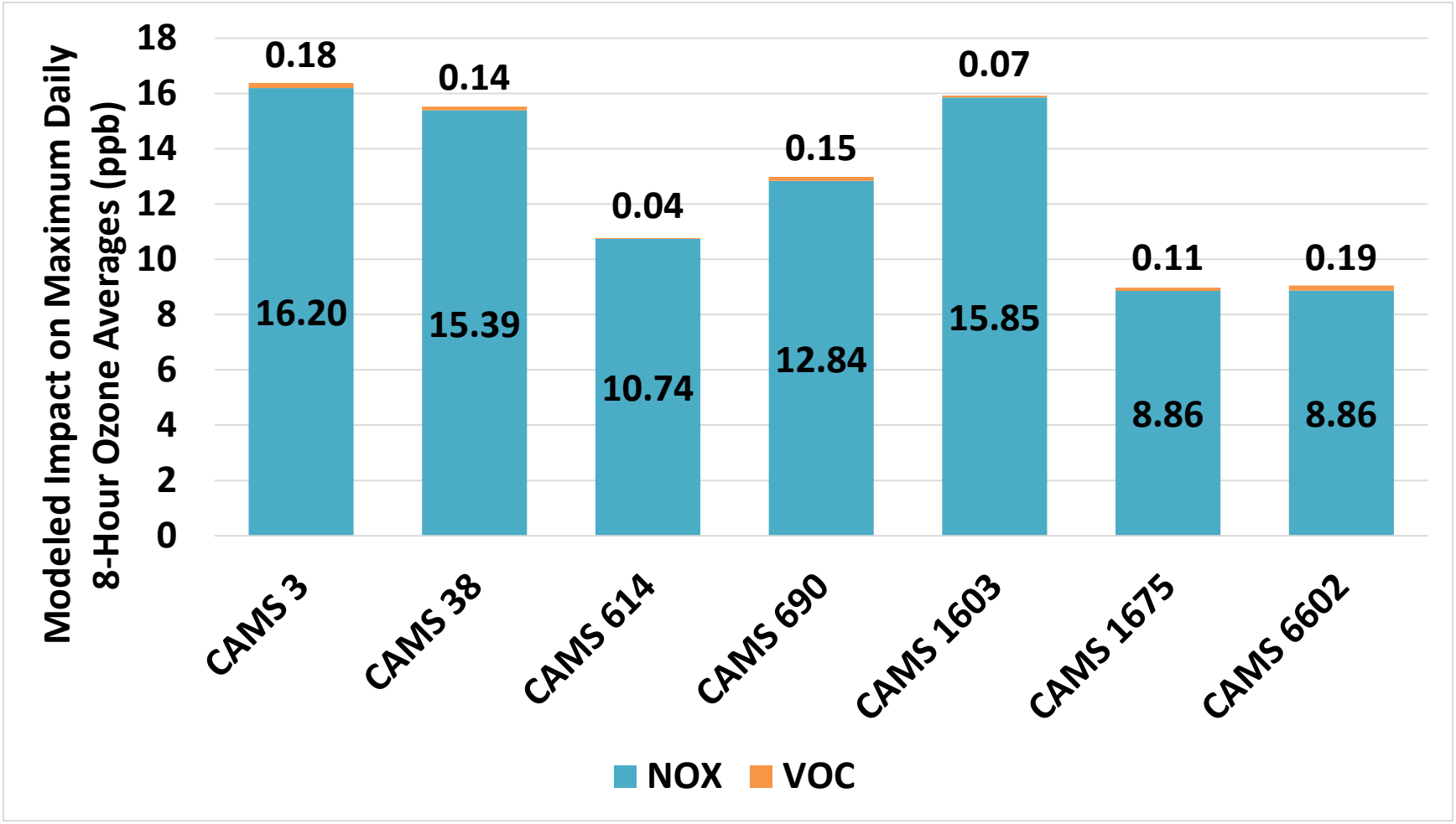
Source: EPA's Annual Air Market Program Data Reports for 2016: https://ampd.epa.gov/ampd/
Note: Decker Turbine Emissions Adjusted by Factors Identified in Table 3 of CAPCOG's 2015 Point Source Emissions Refinement Report available at: http://www.capcog.org/documents/airquality/reports/2015/Point_Source_Emissions_Inventory_Refinement.08-31-15.pdf

NO_X Reductions from AE Demand Mgmt.



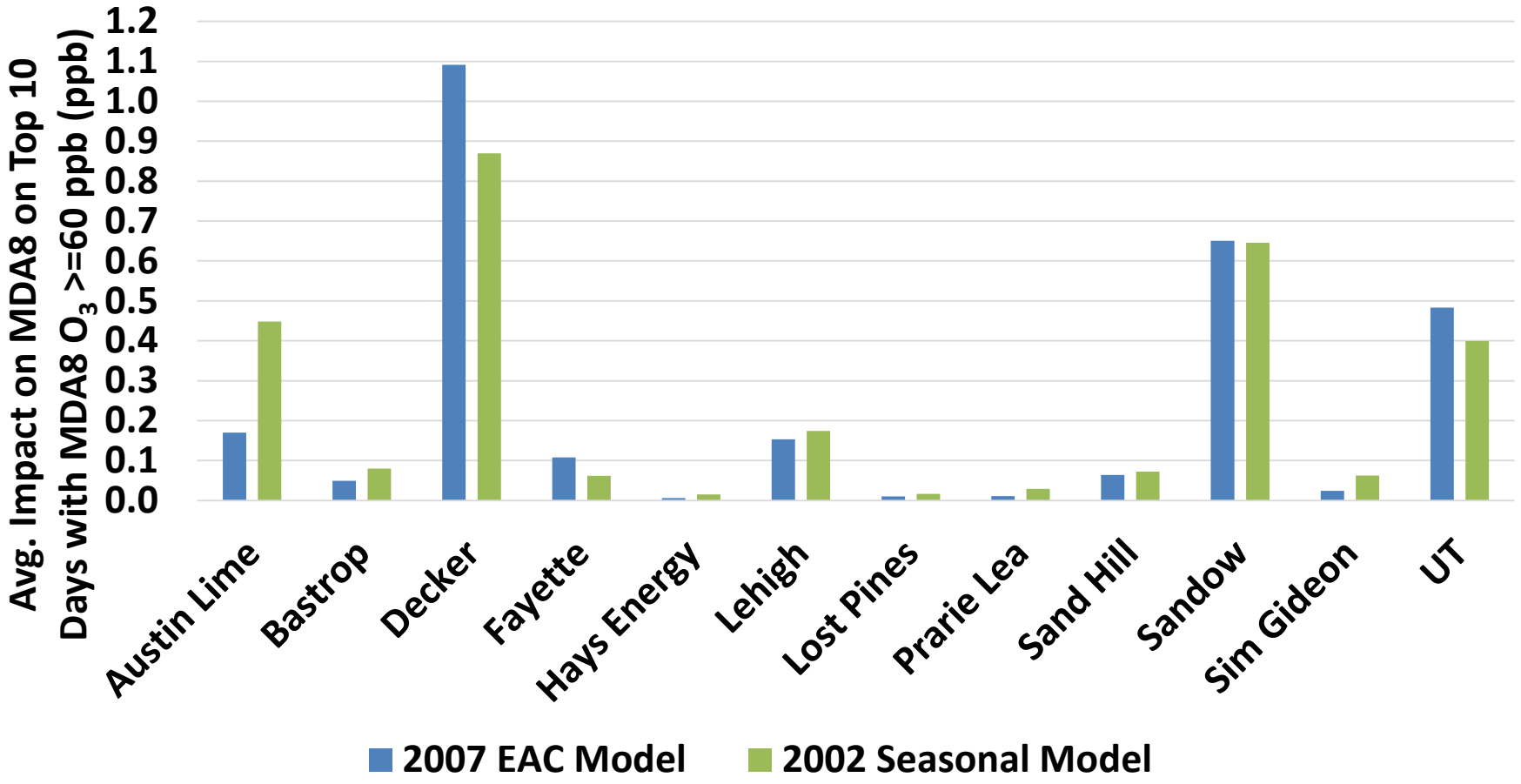
Source: EPA's AVERT Model for 2016: https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert
AE's 2015 153 GW-hr of Energy Savings: https://data.austintexas.gov/Utility/Energy-Efficiency-Annual-Energy-Savings-MWH-/28vy-j5vt

Estimated Impacts of Austin-Round Rock MSA NO_X and VOC Emissions on Current O_3 Levels



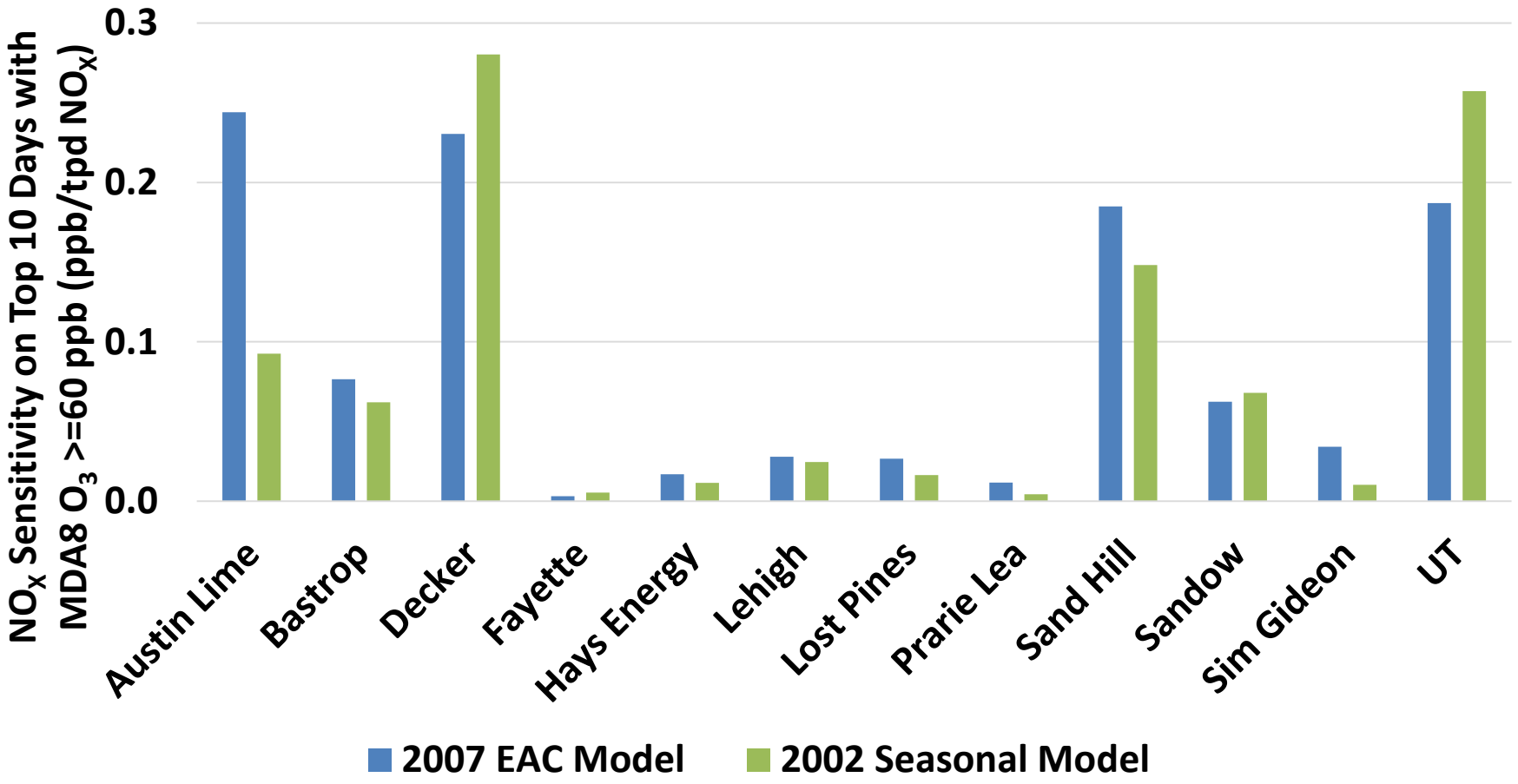
Source: CAPCOG/AACOG 2017 Source Apportionment Modeling: http://www.capcog.org/documents/airquality/reports/2017/6.1.2-CAPCOG_Source_Apportionment_Modeling_Report.pdf; data extracted from spreadsheets and presented in CAPCOG's 2016 Annual Air Quality Report

2009 Modeling of Impact of NO_X Emissions from Local Point Sources (Avg. High MDA8 O_3 impact)



Source: University of Texas at Austin. Data file provided by Tammy Thompson to Andrew Hoekzema
Data summarized in CAPCOG report:
http://www.capcog.org/documents/airquality/reports/2015/Photochemical_Modeling_Analysis_Report_2015-09-04_Final_Combined.pdf

2009 Modeling of Impact of NO_X Emissions from Local Point Sources (Sensitivity ppb/tpd NO_X)

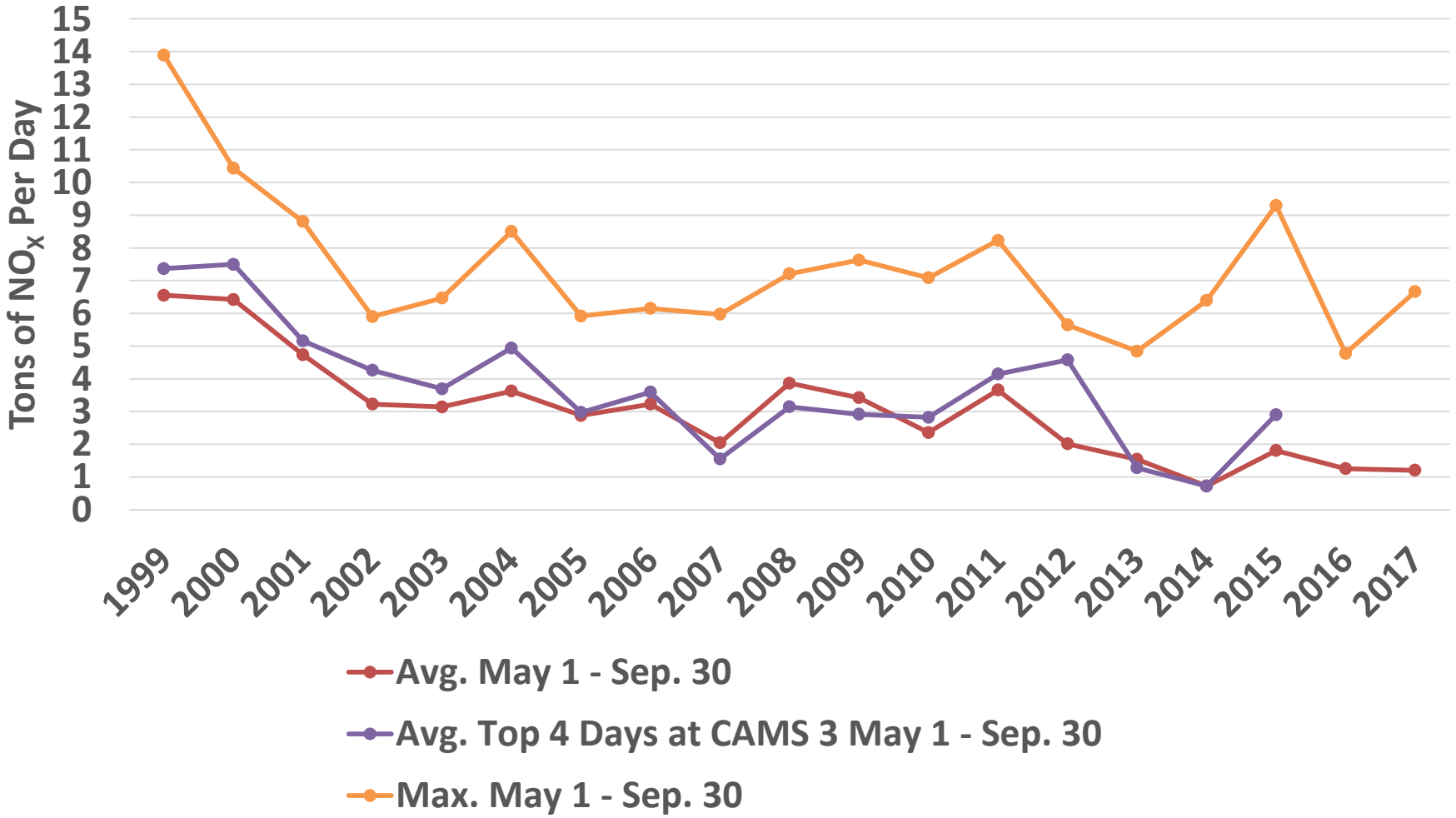


Source: University of Texas at Austin. Data file provided by Tammy Thompson to Andrew Hoekzema
Data summarized in CAPCOG report:
http://www.capcog.org/documents/airquality/reports/2015/Photochemical_Modeling_Analysis_Report_2015-09-04_Final_Combined.pdf

Decker Creek Power Plant

- Capacity: 927 MW
- Two Boilers
- Eight Gas Turbines
- Fuel: Natural Gas
- Constructed: 1967-1978
- 2016 Output: 542,234 MW-hrs (6% utilization)

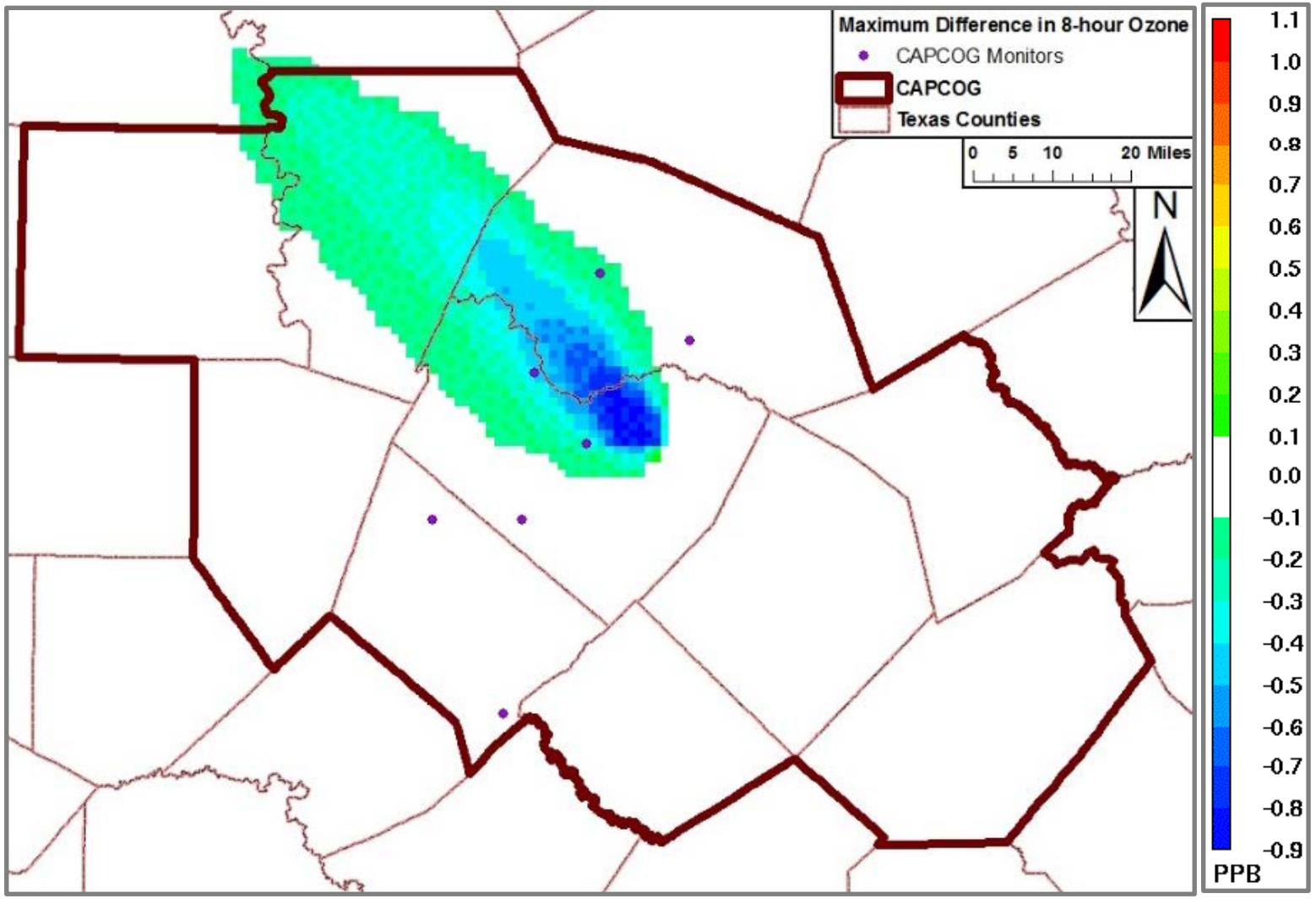
Trends in Decker Boiler NO_X Emissions



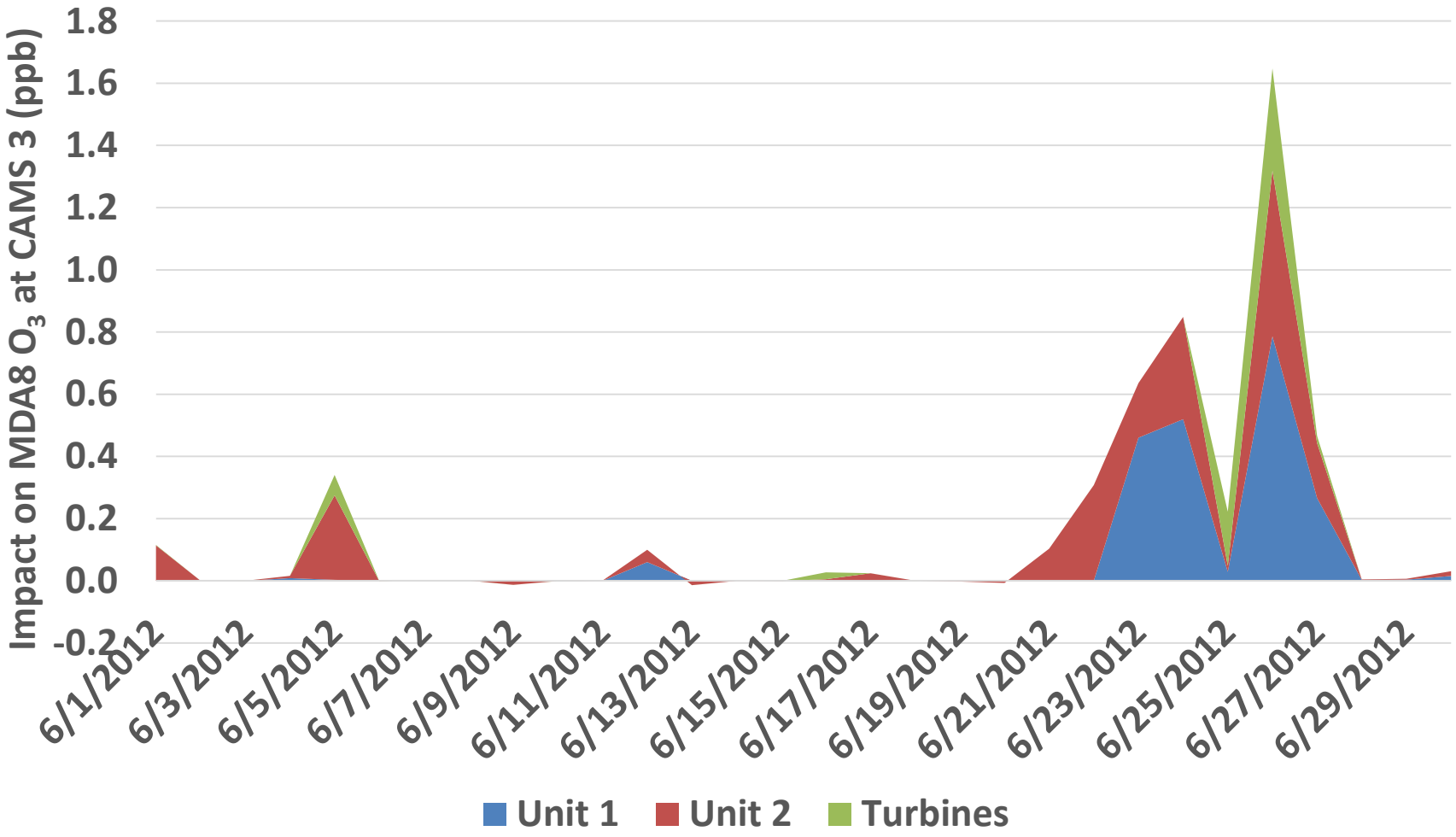
2017 Sensitivity and Control Strategy Modeling

- June 2012 “Base Case”
- Model the Impact of Decker Unit 1
- Model the Impact of Decker Unit 2
- Model the Impact of Decker Turbines
- Model the Impact of Hourly Data for Tx. Lehigh
- Model the Impact of On-Road TERP Grants
- Model the Impact of Non-Road TERP Grants
- Key Monitor for Analysis: CAMS 3

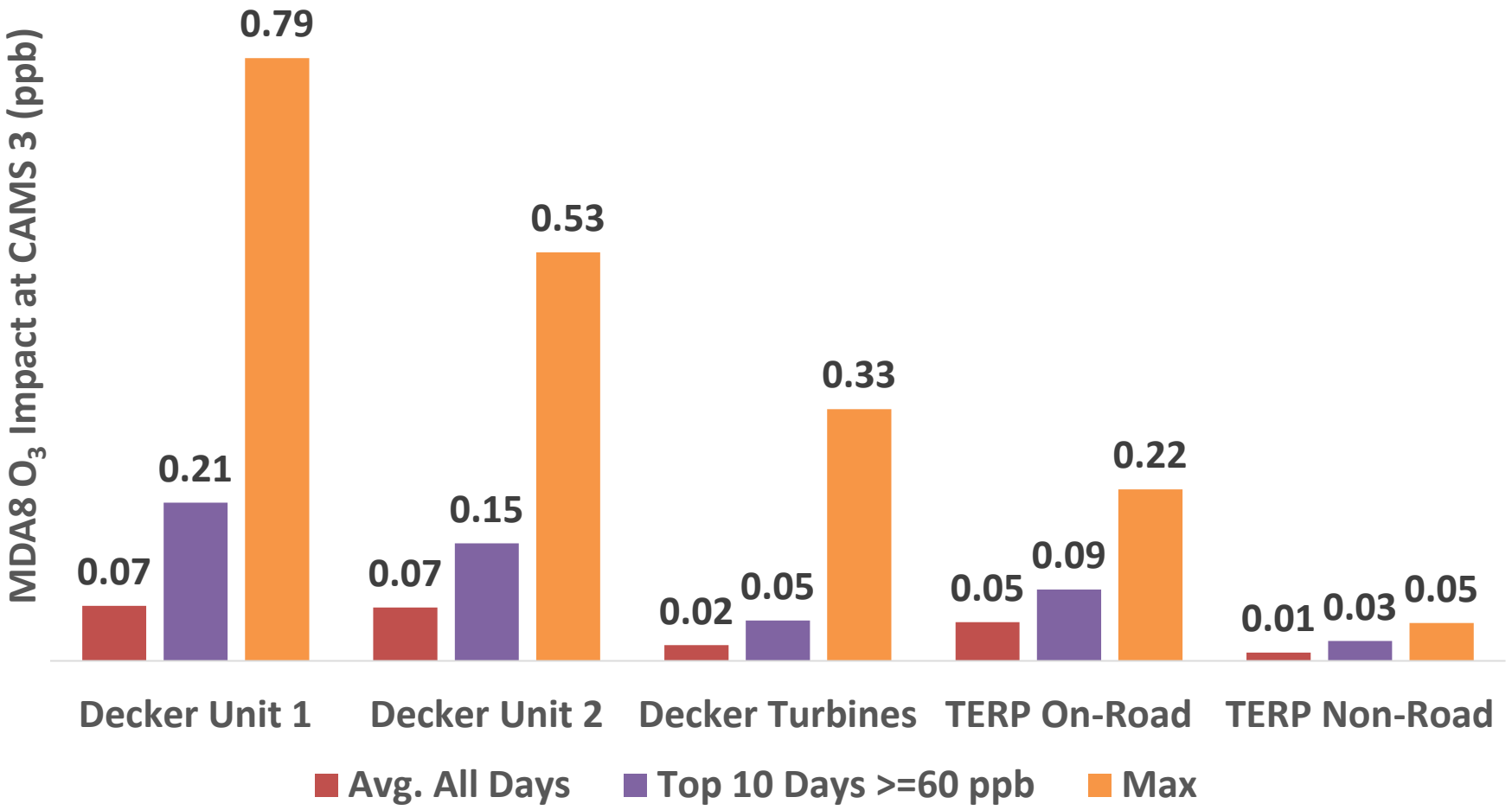
Modeled Impact of Decker Unit 1, June 27, 2012



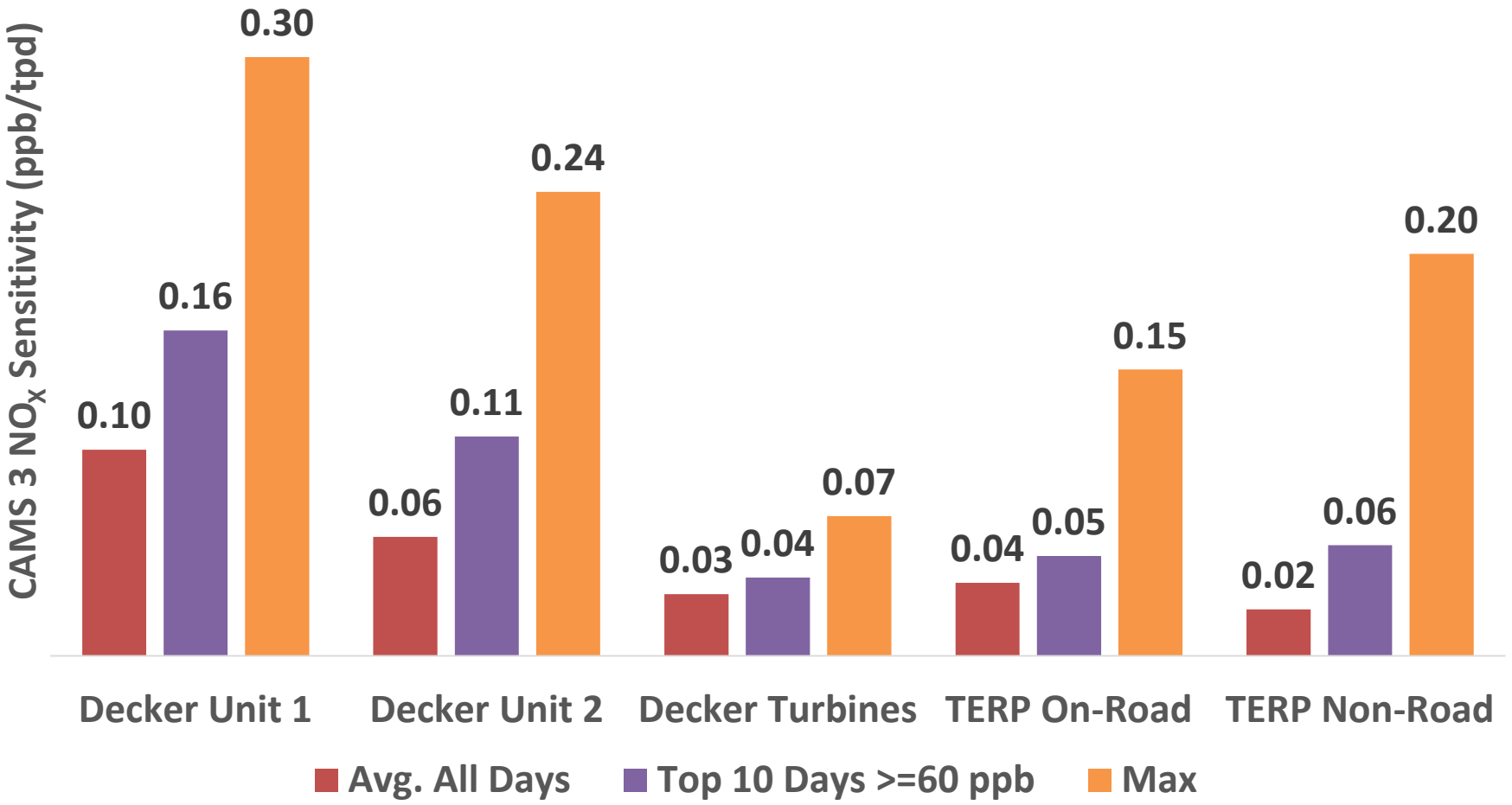
Modeled O_3 Impact of Decker at CAMS 3 by Day



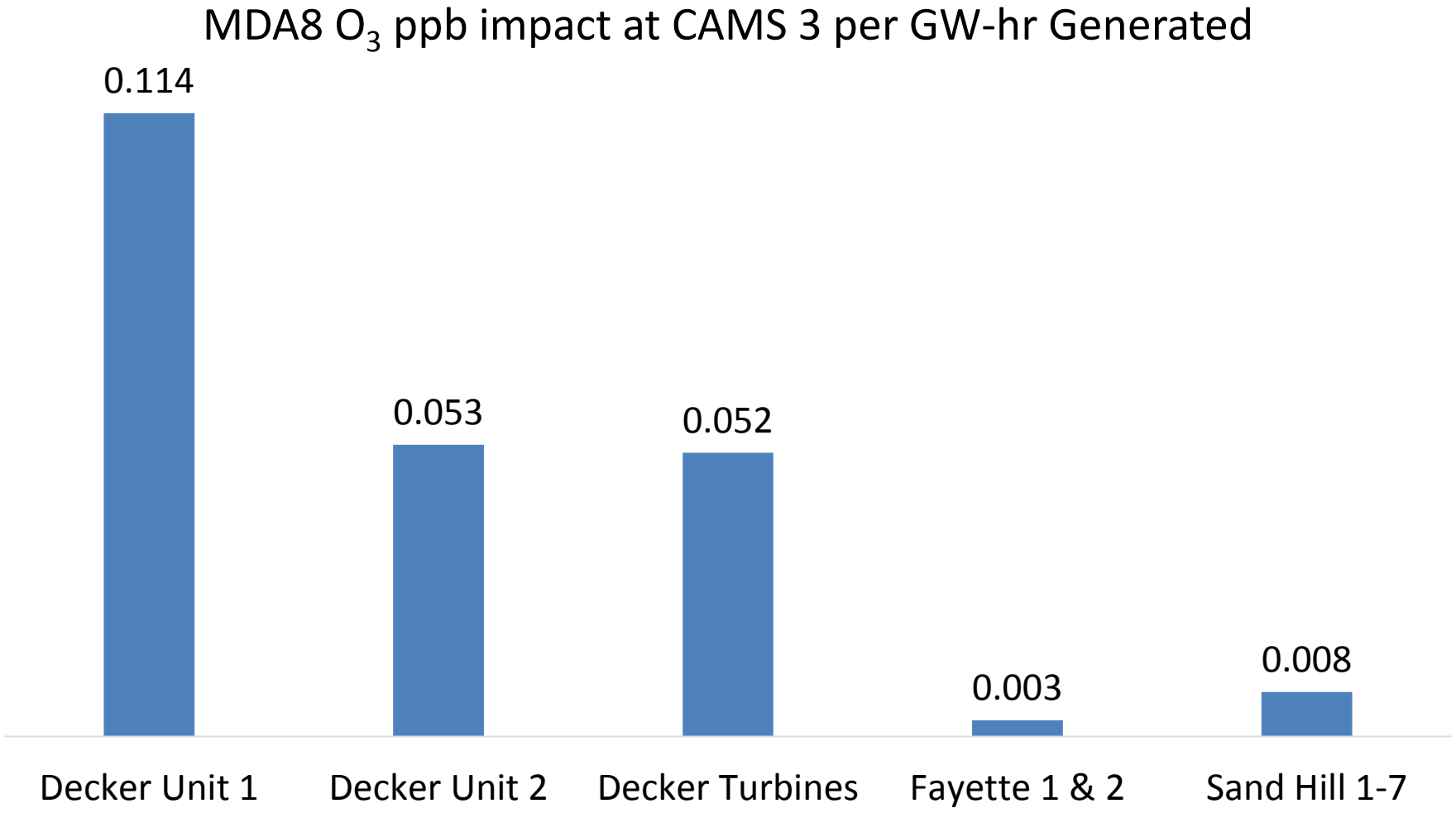
Modeled O_3 Impact of NO_X Reductions at Decker Compared to TERP Program



O_3 Sensitivity to NO_X Emissions Reduction



O_3 Impact per Unit of Electricity Generated



Key Conclusions

- Decker Unit 1 has the highest O_3 impact per unit of electricity generated of any of AE's generating assets
- Reducing NO_X emissions from Decker Units 1 & 2 is more efficient at reducing O_3 levels than TERP grants
- Decker's average NO_X emissions have been declining, but its peak emissions can still be high enough to pose a risk to NAAQS compliance for both the 2015 O_3 NAAQS and the next O_3 NAAQS
- Demand-side strategies are not as effective at reducing these specific risks as more targeted strategies would be
- Retiring Decker units 1 and 2 by early 2019 could significantly reduce those risks, even if new fossil fuel capacity were installed at Decker or Sand Hill as discussed in AE's generation plan

Thank you

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www.capcog.org

http://www.capcog.org/divisions/regional-services/aq-reports

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